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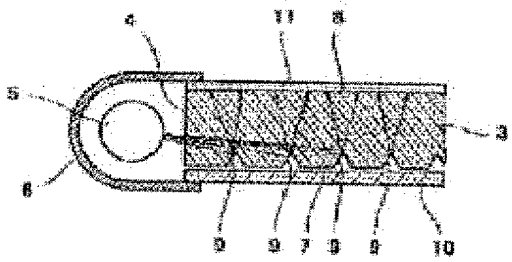
(54) ULTRAVIOLET STERILIZATION UNIT

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an ultraviolet sterilization unit which is thin, requires less space, and can produce a uniform sterilizing effect.
SOLUTION: A light guide 3 made from an acrylic resin and causing the incidence of an ultraviolet ray from an ultraviolet ray source 5 is provided. A light scattering groove 9 and a light reflecting layer are formed on one side 7 of the light guide 3, and a diffusing plate 11 is formed on the other side. The ultraviolet ray emitted from the ultraviolet ray source 5 is made to impinge on the inside of the light guide 3, either directly or after being reflected by a reflector 6. The ultraviolet ray impinging on the inside of the light guide 3 propagates while undergoing total reflections, is scattered on contact with the light scattering groove 9, and is emitted from the front surface 8 of the light guide 3. The ultraviolet ray emitted from the surface 8 of the light guide 3 is further made uniform by the diffusing plate 11 and applied to a subject for sterilization.



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TECHNICAL FIELD

[Field of the Invention]About an ultraviolet-ray-pasteurization unit, in more detail, with a thin shape, this invention can be used for a locker, a shoe cupboard, a toilet, a refrigerator, etc., and its area is large and it relates to the ultraviolet-ray-pasteurization unit which can demonstrate a uniform bactericidal effect.

PRIOR ART

[Description of the Prior Art]Conventionally, the sterilizing unit using the bactericidal effect of ultraviolet rays is known. When using such a sterilizing unit, when it heightens a bactericidal effect that a large area is covered and it may irradiate with ultraviolet rays, it is important.

EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, since the ultraviolet-ray-pasteurization unit of this invention has a thin shape, it can be installed in a locker, a shoe cupboard, a toilet, a refrigerator, etc., without becoming obstructive. Therefore, a space-saving ultraviolet-ray-pasteurization unit is obtained.
[0020]Since ultraviolet rays are not directly irradiated with the ultraviolet-ray-pasteurization unit of this invention from germicidal lamp glass like before but ultraviolet rays are uniformly irradiated from the whole field of a transparent material, moreover, a uniform bactericidal effect can be acquired in a large area.

TECHNICAL PROBLEM

[Problem to be solved by the invention]However, when a large area tends to be covered and it is going to irradiate with ultraviolet rays, it is necessary to put an ultraviolet ray lamp in order in parallel with a constant interval. However, to an ultraviolet ray lamp, when putting an ultraviolet ray lamp in order in parallel in this way, although a bactericidal effect is large in a perpendicular lower part, in the other direction, a bactericidal effect becomes small. This is canceled, in order to acquire a uniform bactericidal effect in a large area, it is necessary to make [many / as possible] the number of a lamp, and there is a problem that cost will become high. The unit itself becomes large and there is a problem of needing a comparatively big space. Since there are many numbers of a lamp, there is also a problem that a maintenance

takes time and effort.
[0004]Succeeding in this invention in view of the problem of such conventional technology, it has a thin shape, and is space-saving, and the purpose of this invention is to provide the ultraviolet-ray-pasteurization unit which can moreover demonstrate a uniform bactericidal effect.

DETAILED DESCRIPTION

[0001]
[Field of the Invention]About an ultraviolet-ray-pasteurization unit, in more detail, with a thin shape, this invention can be used for a locker, a shoe cupboard, a toilet, a refrigerator, etc., and its area is large and it relates to the ultraviolet-ray-pasteurization unit which can demonstrate a uniform bactericidal effect

[0002]
[Description of the Prior Art]Conventionally, the sterilizing unit using the bactericidal effect of ultraviolet rays is known When using such a sterilizing unit, when it heightens a bactericidal effect that a large area is covered and it may irradiate with ultraviolet rays, it is important
[0003]
[Problem to be solved by the invention]However, when a large area tends to be covered and it is going to irradiate with ultraviolet rays, it is necessary to put an ultraviolet ray lamp in order in parallel with a constant interval. However, to an ultraviolet ray lamp, when putting an ultraviolet ray lamp in order in parallel in this way, although a bactericidal effect is large in a perpendicular lower part, in the other direction, a bactericidal effect becomes small. This is canceled, in order to acquire a uniform bactericidal effect in a large area, it is necessary to make [many / as possible] the number of a lamp, and there is a problem that cost will become high. The unit itself becomes large and there is a problem of needing a comparatively big space Since there are many numbers of a lamp, there is also a problem that a maintenance takes time and effort.

[0004]Succeeding in this invention in view of the problem of such conventional technology, it has a thin shape, and is space-saving, and the purpose of this invention is to provide the ultraviolet-ray-pasteurization unit which can moreover demonstrate a uniform bactericidal effect.
[0005] [Means for solving problem]The ultraviolet-ray-pasteurization unit of this invention has a tabular transparent material which has a light scattering means in one field, and the ultraviolet ray source is allotted to the side of this transparent material. A light reflection member is provided in the field in which the light scattering means of the transparent material was provided. In the ultraviolet-ray-pasteurization unit of this invention, it progresses carrying out total internal reflection of the inside of a transparent material, and the light which entered from the side of a transparent material is irradiated by the diffusion board from the field on the side front of a transparent material, i.e., the near field in which the light scattering means is not provided, by a light scattering means. A diffusion board diffuses ultraviolet rays and equalizes the intensity of the ultraviolet rays irradiated from an ultraviolet-ray-pasteurization unit. The light reflection member has prevented light from leaking from the field on the back side of a transparent material

[0006]
[Mode for carrying out the invention]Hereafter, an embodiment of the invention is described
[0007]The ultraviolet-ray-pasteurization unit of this invention has a transparent material

which makes ultraviolet rays penetrate. The light scattering means is formed in one field of a transparent material being able to constitute a light scattering means from an ultraviolet-ray-pasteurization unit of this invention in a light scattering groove, and this light scattering groove being densely formed near the ultraviolet ray source, and following on separating from an ultraviolet ray source -- rough -- ** -- being formed like is preferred By this, from the field on the side front of a transparent material, ultraviolet rays will be irradiated uniformly
[0008]As for an ultraviolet ray source which supplies ultraviolet rays to a transparent material, if a bactericidal effect is taken into consideration, what emits ultraviolet rays with a peak wavelength of 250-260 nm is preferred

[0009]Although ultraviolet rays emitted from the above-mentioned ultraviolet ray source are made to penetrate and glass, a plastic, etc. should be just suitable, construction material of a transparent material has a preferred plastic in respect of weight, and is preferred especially. [of a plastic acrylic at transmissivity of ultraviolet rays or a point of surface hardness] A thing desirable as construction material of a transparent material is poly methyl methacrylate (PMMA) (.) It consists of polycarbonate (PC), polypropylene (PP), polyfluoroethylene (PTEE), polyvinylidene fluoride (PVDF), a polymethyl pentene (TPX), silica glass, multicomponent glass, and these combination

[0010]Since ultraviolet rays which leak and come out from a field in which a light scattering means of a transparent material was provided are reflected in a field of a side which has not established a light scattering means, a light reflection member is provided Things desirable as a light reflection member are a polyester sheet, an aluminum plate, and a silver deposition film.
[0011]An ultraviolet-ray-pasteurization unit of this invention may establish a diffusion means for equalizing further ultraviolet rays emitted from a transparent material. This diffusion means is provided in a field on a side front of an opposite hand with a field on the back side in which a light scattering means of a transparent material was provided. A thing desirable as a diffusion means performs diffusion treatment to a plastic sheet, and construction material of a desirable plastic sheet, They are polyester, poly methyl methacrylate, polycarbonate, polypropylene polyfluoroethylene, polyvinylidene fluoride, a polymethyl pentene, etc A diffusion means is stuck so that it may stick to a field of an opposite hand of a field in which a light scattering means of a transparent material was provided. Or what carried out diffusion treatment beforehand on the surface of a transparent material may be used.
[0012]
[Working example]The embodiment of this invention is described referring to Drawings. Drawing 1 shows the outline composition of the equipment using the ultraviolet-ray-pasteurization unit concerning one embodiment of this invention, and drawing 2 is the detailed sectional view The equipment of drawing 1 adds the lighting device 2 to the ultraviolet-ray-pasteurization unit 1 of this example. As shown in drawing 2, the ultraviolet-ray-pasteurization unit 1 of this example is formed by the ultraviolet ray source 5 along the one side 4 of the tabular transparent material 3, and on the outside of the ultraviolet ray source 5. While keeping ultraviolet rays from leaking, the reflector 6 (product made from aluminum) for leading the ultraviolet rays irradiated by the opposite hand to the transparent material 3 with the transparent material 3 side is formed. In this example, PMMA (560F, Asahi Chemical make) was used for the transparent material 3. The ultraviolet ray lamp (phi10xL120mm, Iwasaki Electric make) was used as the ultraviolet ray source 5 The ultraviolet rays emitted from this ultraviolet ray source 5 have the wavelength distribution which has a peak to a 250-260-nm field in consideration of the bactericidal effect As shown in drawing 1, the end-face tape 13 for preventing the leakage of ultraviolet rays is stuck on the sides other than side 4 of the transparent material 3

[0013]Many light scattering grooves 9 for scattering ultraviolet rays over one field 7 of the transparent material 3, and making it emitted to another field 8 side of the transparent material 3 are formed. The section of the light scattering groove 9 is a slot of V shape. In this example, the light scattering groove 9 is functioning as a light scattering means. The light scattering groove 9 can be formed by machining, laser beam machining, etc. Drawing 3 (a) is a top view of the transparent material 3, and shows the interval in which the light scattering groove 9 is established. As shown in the figure, the light scattering groove 9 is followed on keeping away from the ultraviolet ray source 5 instead of regular intervals, and it is formed so that it may become dense. Thus, by forming the light scattering groove 9, it becomes possible from the field 8 on the side front of the transparent material 3 to make ultraviolet rays emit uniformly. The white reflection film 10 which consists of a polyester sheet (E60L, Toray Industries make) for reflecting in the field 8 side the ultraviolet rays which leak and come out of the field 7 side is formed in the field [in which the light scattering groove 9 of the transparent material 3 was formed] 7 side The diffusion board 11 for equalizing the ultraviolet rays emitted from the transparent material 3 is formed in the field 8 on the side front of the transparent material 3 In this example, the reflection film 10 is functioning as a light reflection member The diffusion board 11 is functioning as a diffusion means.
[0014]The ultraviolet-ray-pasteurization unit of this invention can also be considered as the composition which formed the ultraviolet ray source 5 in two sides of the transparent material 3, as shown in drawing 3 (b). In this case, in order to make ultraviolet rays emit uniformly from the field 8 of the transparent material 3, it is preferred to form the light scattering groove 9 in the portion close to the ultraviolet ray source 5 so that the light scattering groove 9 may become dense [the light scattering groove 9] in the center portion which is separated from a rough next door and the ultraviolet ray source 5 as shown in the figure
[0015]In the ultraviolet-ray-pasteurization unit 1 of this example which has the above composition, the ultraviolet rays emitted from the ultraviolet ray source 5 enter in the transparent material 3, after being reflected by direct or the reflector 6. The ultraviolet rays which entered in the transparent material 3 advance carrying out total internal reflection, are scattered about by the light scattering groove 9, and are emitted from the field 8 on the side front of the transparent material 3. It is further equalized with the diffusion board 11, and is irradiated with the ultraviolet rays which came out from the field 8 of the transparent material 3 by the sterilization subject.

[0016]in order to check the effect of the ultraviolet-ray-pasteurization unit 1 of such this example, the experiment which investigates the bactericidal effect over Escherichia coli as shown in drawing 4 (a) and the key map of (b) was conducted That is, as shown in drawing 4 (a), Escherichia coli is cultivated to the culture medium 21 in the petri dish 22, and the ultraviolet-ray-pasteurization unit 1 of this example was installed in this on [of the petri dish 22] perpendicular at a 15-cm position. As a comparative example, as shown in drawing 4 (b), the bactericidal effect was similarly investigated about the case where only the ultraviolet ray source 25 is used In the case of the comparative example, it installed in a 15-cm position on [of the center section of the culture medium 21 in the petri dish 22 which cultivated Escherichia coli] perpendicular, and UV irradiation was performed in parallel to the above-mentioned embodiment. The result was shown in Table 1.

[0017]
[Table 1]

	生 菌 率 (%)					
装 置	実施例(導光体ユニット)			比較例(紫外線ランプのみ)		
位 置	A	B	C	A	B	C
0秒後	100	100	100	100	100	100
30秒後	42	48	40	88	36	72
60秒後	2	2	3	12	2	15
120秒後	0	0	0	4	0	6

[0018]In the case of a comparative example, the result of Table 1 shows that the bactericidal effect over Escherichia coli is dramatically high in the position of B [directly under] of the ultraviolet ray source 25, but in the position of the positions A and C which are distant from directly under [of the ultraviolet ray source 25], it turns out that a bactericidal effect is low. On the other hand, when the ultraviolet-ray-pasteurization unit 1 of this example is used, also in the position of the positions A and C which are distant from directly under [of not only the position / directly under / B of the sterilizing unit 1 but the sterilizing unit 1], it turns out that a bactericidal effect is dramatically high. Thus, when using the ultraviolet-ray-pasteurization unit 1 of this example, it was able to check that covered a large area and a high bactericidal effect was acquired.

[0019]
[Effect of the Invention]As explained above, since the ultraviolet-ray-pasteurization unit of this invention of this invention has a thin shape, it can be installed in a locker, a shoe cupboard, a toilet, a refrigerator, etc., without becoming obstructive. Therefore, a space-saving ultraviolet-ray-pasteurization unit is obtained

[0020]Since ultraviolet rays are not directly irradiated with the ultraviolet-ray-pasteurization unit of this invention from germicidal lamp glass like before but ultraviolet rays are uniformly irradiated from the whole field of a transparent material, moreover, a uniform bactericidal effect can be acquired in a large area.

CLAIMS

[Claim(s)]
[Claim 1]An ultraviolet-ray-pasteurization unit comprising:
A tabular transparent material which has a light scattering means in one field
An ultraviolet ray source allotted to the side of this transparent material
A light reflection member provided in said one field side of said transparent material.

[Claim 2]as said light scattering means is densely formed near said ultraviolet ray source and separates from this ultraviolet ray source -- rough -- ** -- the ultraviolet-ray-pasteurization unit according to claim 1 which is the light scattering groove currently formed like.

[Claim 3]The ultraviolet-ray-pasteurization unit according to claim 1 or 2 which is what said transparent material becomes from poly methyl methacrylate, polycarbonate, polypropylene, polyfluoroethylene, polyvinylidene fluoride, a polymethyl pentene, silica glass, multicomponent glass, and these combination.

[Claim 4]The ultraviolet-ray-pasteurization unit according to any one of claims 1 to 3 which is a range whose peak wavelength of ultraviolet rays irradiated from said ultraviolet ray source is 250 nm - 260 nm

[Claim 5]An ultraviolet-ray-pasteurization unit having further a diffusion means which diffuses ultraviolet rays emitted from a field of another side of said light guide plate

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審査請求　未請求　請求項の数５　ＯＬ　（全 ５ 頁）

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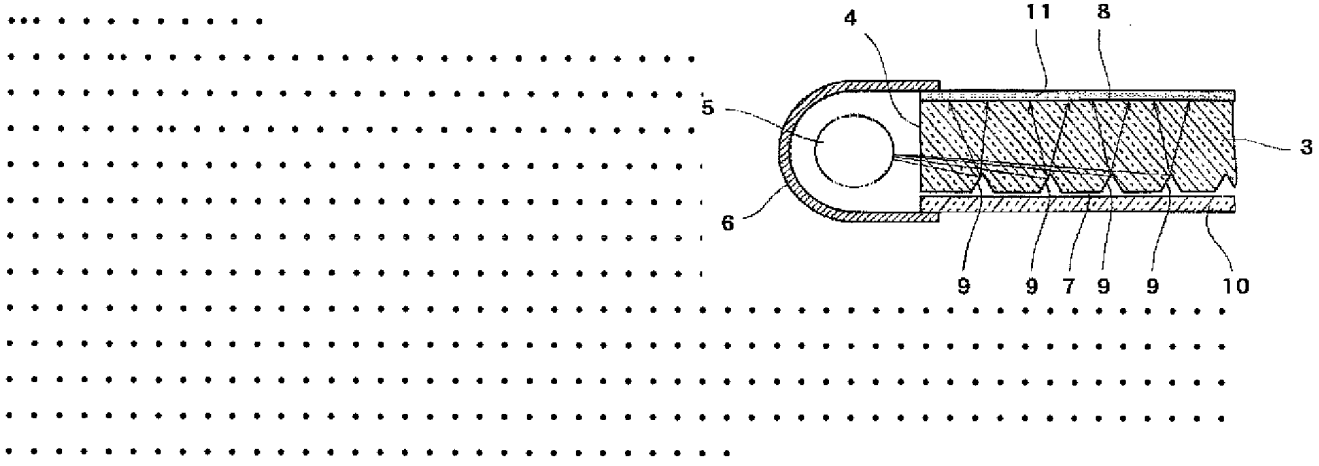
(54)【発明の名称】　紫外線殺菌ユニット



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【特許請求の範囲】

【請求項１】　一方の面に光散乱手段を有する板状の導光体と、該導光体の側面に配された紫外線光源と　前記導光体の前記一方の面側に設けられた光反射部材とを備えたことを特徴とする紫外線殺菌ユニット。

【請求項２】　前記光散乱手段は、前記紫外線光源の近傍で密に形成され、該紫外線光源から離れるにつれて粗となるように形成されている光散乱溝である請求項１記載の紫外線殺菌ユニット。

【請求項３】　前記導光体が、ポリメタクリル酸メチル　ポリカーボネート　ポリプロピレン、ポリフッ化エチレン、ポリフッ化ビニリデン、ポリメチルペンテン　石英ガラス、多成分ガラス及びこれらの組合せからなるものである請求項１又は２に記載の紫外線殺菌ユニット。

【請求項４】　前記紫外線光源から照射される紫外線のピーク波長が２５０ｎｍ～２６０ｎｍの範囲である請求項１乃至３の何れかに記載の紫外線殺菌ユニット。

【請求項５】　前記導光板の他方の面から出射する紫外線を拡散させる拡散手段を更に備えたことを特徴とする紫外線殺菌ユニット。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は　紫外線殺菌ユニットに関し、更に詳しくは　薄型で　ロッカー　下駄箱　トイレ、冷蔵庫等に使用することができ、面積が広く　均一な殺菌効果を発揮し得る紫外線殺菌ユニットに関する。

【０００２】

【従来の技術】従来より　紫外線の殺菌効果を利用した殺菌ユニットが知られている。このような殺菌ユニットを用いる場合　広い面積に亘って紫外線を照射し得ることが　殺菌効果を高めるうえで重要である。

【０００３】

【発明が解決しようとする課題】ところが、広い面積に亘って紫外線を照射しようとすると　紫外線ランプを一定間隔で平行に並べることが必要となる。しかし　このように紫外線ランプを平行に並べる場合、紫外線ランプに対して鉛直下方では殺菌効果が大きいが、それ以外の方向では殺菌効果が小さくなる。これを解消して　広い面積でムラのない殺菌効果を得るためには　ランプの本数をできる限り多くすることが必要となり、コストが高くなってしまうという問題点がある。また、ユニットそのものが大きくなり、比較的大きなスペースを必要とするという問題点がある。更に、ランプの本数が多いためにメンテナンスに手間を要するという問題点もある。

【０００４】本発明はこのような従来技術の問題点に鑑みて為されたものであり　本発明の目的は、薄型でかつ省スペースで　しかも均一な殺菌効果を発揮し得る紫外線殺菌ユニットを提供することである。

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【０００５】

【課題を解決するための手段】本発明の紫外線殺菌ユニットは、一方の面に光散乱手段を有する板状の導光体を有し　この導光体の側面には紫外線光源が配されている。導光体の光散乱手段が設けられた面には光反射部材が設けられる。本発明の紫外線殺菌ユニットでは　導光体の側面から入射した光は　導光体内を全反射しながら進み　光散乱手段によって導光体の表側の面、即ち光散乱手段が設けられていない側の面から拡散板に照射される。拡散板は紫外線を拡散させて、紫外線殺菌ユニットから照射される紫外線の強度を均一化する。光反射部材は導光体の裏側の面から光が漏れるのを防止している。

【０００６】

【発明の実施の形態】以下　本発明の実施の形態について説明する。

【０００７】本発明の紫外線殺菌ユニットは、紫外線を透過させる導光体を有している。また　導光体の一方の面には光散乱手段が形成されている。本発明の紫外線殺菌ユニットでは、光散乱手段は光散乱溝で構成することができ、この光散乱溝は　紫外線光源の近傍で密に形成され　紫外線光源から離れるに伴って粗となるように形成されるのが好ましい。これにより　導光体の表側の面からは紫外線が均一に照射されることとなる。

【０００８】導光体に紫外線を供給する紫外線光源は　殺菌効果を考慮すれば、ピーク波長２５０～２６０ｎｍの紫外線を発するものが好ましい。

【０００９】導光体の材質は　上記の紫外線光源から発せられる紫外線を透過させるものであればよく　ガラス　プラスチック等が適しているが　重量の点でプラスチックが好ましく、中でも　紫外線の透過率や表面硬度の点でアクリル系のプラスチックが好ましい。導光体の材質として好ましいものは　ポリメタクリル酸メチル（（ＰＭＭＡ）　ポリカーボネート（ＰＣ）、ポリプロピレン（ＰＰ）　ポリフッ化エチレン（ＰＴＥＥ）、ポリフッ化ビニリデン（ＰＶＤＦ）、ポリメチルペンテン（ＴＰＸ）、石英ガラス　多成分ガラス及びこれらの組合せからなるものである。

【００１０】また、光反射部材は　導光体の光散乱手段を設けた面から漏れ出る紫外線を光散乱手段を設けていない側の面に反射するために設けられている。光反射部材として好ましいものは　ポリエステルシート　アルミニウム板、銀蒸着フィルムである。

【００１１】更に、本発明の紫外線殺菌ユニットは、導光体から出射される紫外線を更に均一化するための拡散手段を設けてもよい。この拡散手段は　導光体の光散乱手段を設けた裏側の面とは反対側の表側の面に設けられる。拡散手段として好ましいものはプラスチックシートに拡散処理を施したものであり、好ましいプラスチックシートの材質は　ポリエステル、ポリメタクリル酸メチル　ポリカーボネート　ポリプロピレンポリフッ化エチ

レン、ポリフッ化ビニリデン、ポリメチルペンテン等である。拡散手段は、導光体の光散乱手段を設けた面の反対側の面に密着するように貼り付ける。或いは　導光体の表面に予め拡散処理をしたものを用いてもよい。

【００１２】

【実施例】本発明の実施例について　図面を参照しながら説明する。図１は本発明の一実施例に係る紫外線殺菌ユニットを用いた装置の概略構成を示し　図２はその詳細断面図である。図１の装置は、本実施例の紫外線殺菌ユニット１に点灯装置２を付加したものである。本実施例の紫外線殺菌ユニット１は、図２に示すように　板状の導光体３の一つの側面４に沿って紫外線光源５が設けられ　紫外線光源５の外側には、紫外線が漏れないようにするとともに　導光体３側とは反対側に照射される紫外線を導光体３に導くためのリフレクタ６（アルミ製）が設けられている。本実施例では、導光体３にはＰＭＭＡ（５６０Ｆ　旭化成製）を用いた。また、紫外線光源５として紫外線ランプ（φ１０×Ｌ１２０ｍｍ　岩崎電気製）を用いた。この紫外線光源５から出射される紫外線は　殺菌効果を考慮して　２５０～２６０ｎｍの領域にピークを有する波長分布を有している。導光体３の側面４以外の側面には、図１に示すように、紫外線の漏れを防止するための端面テープ１３が貼り付けられている。

【００１３】導光体３の一方の面７には紫外線を散乱させて導光体３のもう一方の面８側に出射させるための光散乱溝９が多数設けられている。光散乱溝９は　断面がＶ字型の溝である。本実施例では光散乱溝９が光散乱手段として機能している。光散乱溝９は機械加工　レーザ加工等によって形成することができる。図３（ａ）は導光体３の平面図であり、光散乱溝９が設けられる間隔を示している。同図に示すように、光散乱溝９は等間隔ではなく、紫外線光源５から遠ざかるに伴って密となるように形成されている。このように光散乱溝９を形成することにより、導光体３の表側の面８から紫外線を均一に出射させることが可能となる。導光体３の光散乱溝９を形成した面７側には、面７側から漏れ出る紫外線を面８＊側に反射させるための　ポリエステルシート（Ｅ６０Ｌ　東レ製）からなる白色の反射フィルム１０が設けられている。更に　導光体３の表側の面８には、導光体３から出射される紫外線を均一化するための拡散板１１が設けられている。本実施例では反射フィルム１０が光反射部材として機能している。また、拡散板１１が拡散手段として機能している。

【００１４】なお、本発明の紫外線殺菌ユニットは、図３（ｂ）に示すように　導光体３の２つの側面に紫外線光源５を設けた構成とすることもできる。この場合には　導光体３の面８から紫外線を均一に出射させるために　同図に示すように、紫外線光源５に近接した部分では光散乱溝９が粗となり　紫外線光源５から離れた中央部分では光散乱溝９が密となるように光散乱溝９を形成することが好ましい。

【００１５】以上の構成を有する本実施例の紫外線殺菌ユニット１では　紫外線光源５から出射する紫外線は直接又はリフレクタ６によって反射された後、導光体３内に入射する。導光体３内に入射した紫外線は全反射しながら進行し　光散乱溝９によって散乱され、導光体３の表側の面８から出射する。導光体３の面８から出た紫外線は　更に拡散板１１で均一化され　殺菌対象物に照射される。

【００１６】このような本実施例の紫外線殺菌ユニット１の効果を確認するため、図４（ａ）及び（ｂ）の概念図に示すような大腸菌に対する殺菌効果を調べる実験を行った。即ち　図４（ａ）に示すように、シャーレ２２内の培地２１に大腸菌を培養しておき　これに本実施例の紫外線殺菌ユニット１をシャーレ２２の鉛直上１５ｃｍの位置に設置した。比較例として　図４（ｂ）に示すように、紫外線光源２５のみを用いた場合についても同様に殺菌効果を調べた。比較例の場合　大腸菌を培養したシャーレ２２内の培地２１の中央部の鉛直上１５ｃｍの位置に設置し　上述の実施例と並行して紫外線照射を行った。その結果を表１に示した。

【００１７】

【表１】

	生　菌　率（％）					
装　置	実施例（導光体ユニット）			比較例（紫外線ランプのみ）		
位　置	A	B	C	A	B	C
0秒後	１００	１００	１００	１００	１００	１００
３０秒後	４２	４８	４０	８８	３６	７２
６０秒後	２	２	３	１２	２	１５
１２０秒後	０	０	０	４	０	０

【００１８】表１の結果から、比較例の場合には紫外線光源２５の直下のＢの位置では、大腸菌に対する殺菌効果が非常に高いことが分かるが、紫外線光源２５の直下から離れた位置Ａ及びＣの位置では殺菌効果が低いこと

が分かる。これに対して　本実施例の紫外線殺菌ユニット１を使用した場合，殺菌ユニット１の直下の位置Ｂのみならず，殺菌ユニット１の直下から離れた位置Ａ及びＣの位置に於いても殺菌効果が非常に高いことが分かる。このように　本実施例の紫外線殺菌ユニット１を使用すれば，広い面積に亘って高い殺菌効果が得られることを確認することができた。

【００１９】

【発明の効果】以上説明したように　本発明の本発明の紫外線殺菌ユニットは薄型であるため　ロッカー　下駄箱　トイレ　冷蔵庫等に邪魔にならずに設置することができる。従って　省スペースの紫外線殺菌ユニットが得られる。

【００２０】また，本発明の紫外線殺菌ユニットは，従来のように殺菌灯から直接紫外線が照射されるのではなく　導光体の面全体から紫外線が均一に照射されるので　広い面積でしかも均一な殺菌効果を得ることができる。

【図面の簡単な説明】

【図１】本発明の紫外線殺菌ユニットを点灯装置とともに示した斜視図である。

【図２】図１に於ける紫外線殺菌ユニットの部分断面図である。

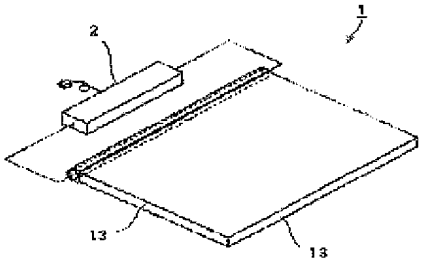
【図３】（ａ）及び（ｂ）は，それぞれ紫外線殺菌ユニットの導光体に形成される光散乱溝の間隔を示すための平面図である。

【図４】（ａ）及び（ｂ）は　それぞれ実施例の紫外線殺菌ユニット及び比較例の紫外線光源の殺菌効果を確認するための試験を示す概略図である。

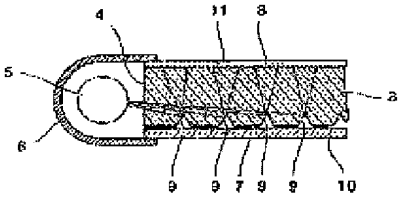
【符号の説明】

１…紫外線殺菌ユニット
３…導光体
４…側面
５…紫外線光源
６…リフレクタ
９…光散乱溝
１０…反射フィルム
１１…拡散板
１３…両面テープ

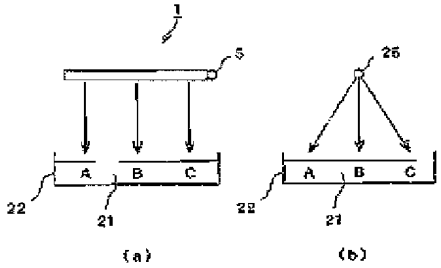
【図１】



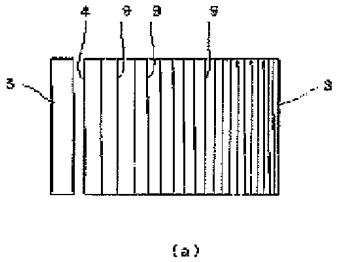
【図２】



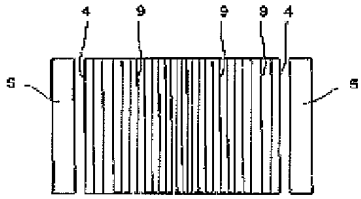
【図４】



【図３】



(a)



(b)